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A STICKY TRAP BOARD USED IN SCOUTING FOR PEAR PSYLLA

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Numerous devices and methods have been developed to facilitate scouting work in connection with large-scale insect-control projects. The detection of infestations by the visual method of inspection often requires a great deal of manpower, the demand for which increases as the progress in control results in extremely low insect population levels, and it becomes more difficult to determine the effectiveness of the suppressive measures and to delimit the areas of infestation. In the case of the project for the control of the pear psylla (Psylla pyricola Foerst.) in the Pacific Northwest, the efficiency of the scouting work has been markedly increased by the development of a sticky trap board.

For the first few years following the discovery of the pear psylla near Spokane, Wash., dependence was placed on visual inspection, which is effective in giving a rough picture of the situation, and which depends on the ability of the scouts to look for and detect any stages of the insect and other evidence of its presence, such as cast skins, honeydew, and necrotic lesions on the leaves. This method is adversely affected by such factors as low density of the insect population, unfavorable weather, occurrence of the insect in a stage difficult to detect, and other unfavorable factors. There was a definite need for a more reliable and efficient method of detecting infestations.

During the summer of 1943 the idea was conceived of collecting the pear psylla on a sticky surface, a possibility favored by the flight and jumping habits of the adult insects. The original trap (fig. 1) consisted of a quart-size can attached to a 1/2-inch-square iron rod about 8 feet long. Paper was rolled around the can and held in place with the aid of a rubber band at each end. A sticky tree-banding material was smeared on the paper just before use. A removable guard made of 1/2-inch-mesh wire cloth was placed over the can to prevent leaves from collecting on the sticky surface. This trap was tested on a known infested property where an experienced scout could

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1/ The authors acknowledge with grateful appreciation suggestions made by other employees on the Pear Psylla Control Project.

find an adult psylla in 5 to 10 minutes by visual inspection. It was necessary only to pass the can through various portions of the tree for a few seconds to collect 1 or 2 adults at each trial. Experience with the use of the can showed that it represented an advance in methods, since it saved time and detected infestations in some cases where visual inspection had failed.

The next step was to use the sticky material on flat boards which could be hung in a tree (figs. 2 and 3) and left there as long as desired. This insured having a trap present on a tree or in an orchard whenever the adult insect was active. A yellow color was decided upon after a series of preliminary tests indicated that yellow traps collected considerably more pear psyllas than other colors tested, which included orange, green, and white. The last-mentioned was the least effective.

Exposure and Inspection of Traps

The traps were suspended with wires from the outer branches of pear trees, since observations indicated that the possibilities of detecting an infestation were better around the lower periphery than at the upper levels. The number of traps distributed in an orchard varied from 10 to 25 percent of the total number of trees present. The traps were exposed for from 5 to 45 days before inspection and removal. The maximum period permitted the immature stages of the pear psylla to develop into the adult stage if the traps were placed at a time when only eggs or nymphs were present.

Inspection of the traps was comparatively easier than tree inspection. Specimens were taken off the sticky surface with a piece of toothpick, pine needle, or weed, and placed in a vial containing preserving fluid. Pear psyllas allowed to remain in the sticky substance under field conditions for a period of 5 months were readily identified. Final determinations of the insects were made at the project office in Spokane, subject to verification by the Division of Insect Identification at Washington, D. C.

Use of Traps for Pear Psylla Survey

During the late summer of 1943 this new method of scouting was used as a supplement to the regularly planned program of visual inspection in effect. The use of traps as compared with visual inspection not only proved efficient but also inexpensive and simple. A contract was let in the spring of 1944 for the manufacture of the traps, complete and ready for exposure, and boxed for shipment, at a cost of 8 cents each. Although a final evaluation of the efficiency of the pear psylla traps can be made only after more extensive experience with it, the following table indicates the general trend.

Table 1.—Comparison of visual inspection and trapping for the pear psylla in Spokane County, Wash., August - November 1943

	Visual	Traps
Man-hours used	6,900	516*
Property visits	5,845	662
Trees inspected	17,080	2,124
Properties found infested	44	26
Man-hours work per infestation found	157	20

* Man-hours to place, remove, and inspect the traps.

Infestations were found by means of traps on properties on which all of the trees had already been visually inspected, with negative results.

In addition to the application of the pear psylla trap to scouting, worthwhile information was obtained on the flight habits of psyllids in general. Although no pear psyllas were collected, psyllids other than this species were taken in locations which indicated the usefulness of the traps to intercept insects in flight. For example, psyllids tentatively identified as Psylla minor Crawf. and Aphalara sp. were collected from traps exposed on an 8- and on a 15-story building in the center of Spokane. An unidentified psyllid was taken from a trap suspended on a fir tree near the summit of Mount Spokane at an approximate elevation of 5,000 feet. Boards were also suspended by means of wires from trees and fence lines in various locations from the floor of Spokane Valley, Wash., to higher elevations following up the canyons. Psyllid specimens (other than the pear psylla) were collected from all elevations.

Experience with the use of the sticky traps on the Pear Psylla Control Project has shown that this trap or variations of it may be useful in general insect surveys. Psyllids represent a small percentage of the insects collected by the traps. Adhesive qualities of the traps are such that insects as large as yellow jackets and occasionally grasshoppers are collected and held permanently. Heavy applications of the sticky material should be used when large insects are to be captured.

Durability of the Sticky Substance

When the sticky material is placed on a surface that has been made impervious to oily substances by means of paint, lacquer, or shellac, the sticky quality of the adhesive is retained indefinitely. At temperatures below which most insect flight ceases, the substance will still be sticky. Temperatures near and below the freezing point

result in a semi-tacky surface but it returns to its original condition with warm weather. Light rains and showers do not affect the stickiness or other qualities of the substance. Heavy, beating rains result in white milky spots and streaks on the surface, which slow up inspection. It is not possible to state at this time the effect of various spray materials on the insects on the trap or the adhesive, but, so far as known, sprays of oil and nicotine sulfate have no effect. Heavy dust storms may cover the traps to the extent of turning them black with dirt. In order to inspect such boards the surface may first be cleaned with solvent applied with an atomizer.

Specifications for Manufacture of Traps

A description of the pear psylla trap is summarized in the following specifications, which were drawn to have the traps manufactured by a contractor:

Material. Seasoned, No. 1 wood (pine, fir, or cedar).

Size. Five inches wide by 10 inches long by 1/4 inch thick, with permissible tolerance of 1/4 inch in width. Each board must be drilled with one hole approximately 5/16 inch in diameter, 3/4 inch from end midway between sides. (It might be desirable to have a hole drilled at each end for use in tying the trap more securely in situations where this may be desirable or for use if one end of the board between the hole and the end breaks out.)

Finishing. Boards to be surfaced four sides. All six surfaces to be coated evenly with one coat of yellow street-marking lacquer, to provide a glossy surface.

Marking. Both sides of each board, after the application of the lacquer, but prior to the application of the insect barrier, shall be marked with two parallel black pencil lines drawn lengthwise of the board so as to divide the surface into three sections, each section approximately 1 2/3 inches by 10 inches in size.

Insect barrier. Each board to be coated on both sides with insect barrier in such a manner as to retain its original adhesive qualities. Insect barrier should be applied approximately one pound per 40 boards.

Hangers. A hanger is to be provided for each board as follows: One end of an 11-inch piece of 18-guage soft iron wire, preferably galvanized, to be passed through the hole at end of each trap and twisted to form a completed loop. The free end of wire is to remain protruding from board in order not to come in contact with insect barrier.

Packaging. Completed boards to be packed in fiber board (new or used) or wooden boxes with lids, approximately 50 to 150 boards per box. Boards to be packed with wires or alternate boards extending in same direction in order to provide clearance between boards.

Painting

Where only a few traps are needed, the paint may be applied with a hand brush. For large-scale production a fast-drying enamel, or preferably 5-minute street-marking lacquer, should be applied to all surfaces of the board with a paint gun. A durable trap of high quality may be produced if No. 1 or No. 2 lumber is used and 2 coats of paint are applied. The first coat should be a primer and the second coat enamel or lacquer. The latter, in addition to the advantage of fast drying, is also more resistant to steam cleaning.

Application of Adhesive to Traps

The sticky substance may be applied to the boards manually with a spatula, or by coating the rollers of a clothes wringer and running the boards through the rollers. The latter method is faster, and less material is used per trap. One pound of sticky material will coat 35 to 40 traps of the above dimensions. The rollers on most wringers can be adjusted so that the desired pressure can be placed on the boards, allowing for an even coat of adhesive. In cold weather the material should be kept warm in order to facilitate application.

Packing Traps

As the sticky traps are prepared they may be packed in containers of fiberboard or wood. In order to prevent the boards from sticking together tightly, small pieces of wire or wood must be placed between each two traps, or they may be packed as described in the specifications. The traps should be protected from outside sources of insects previous to use.

Reconditioning

After the traps have been inspected, they may be cleaned and used over again. Approximately 15 percent loss may be expected between successive periods of use through breakage and other factors. The boards may be washed with a solvent, such as kerosene, benzine, or xylene. For washing large numbers of boards steam cleaning, as used in auto laundries, has proved fairly satisfactory.

The steam used for cleaning the traps used on the Pear Psylla Control Project was generated by a portable steam cleaner which produced about 120 pounds of pressure. This equipment required about 15 gallons of stove oil per day for fuel. About 6 pounds of a cleaning compound was dissolved in 12 gallons of water and poured into the soap tank of the cleaner. The soap gage was set at 4. Two planks, 2 by 14 inches by 12 feet long, were set end to end on supports, and 50 traps were

placed flat side by side on the planks. Nails were used in such a manner as to prevent the boards from flying off the planks when subjected to the pressure produced by the steam generator. The nozzle was held about 1 inch from the boards, and the steam was directed horizontally away from the operator. This procedure drove the steam away from the boards so that they were visible at all times. When one man used the steam nozzle, other men turned the boards over or took the clean boards off and replaced them with dirty ones. A 3-man crew was able to clean 150 to 200 traps per hour.

Use of Materials other than Wood for Trap Construction

It is possible that time and materials may be saved if the trap is constructed of paperboard. Paper traps have been used under very severe conditions and show possibilities of replacing wood. The weight of paper should be from 6- to 14-ply. Owing to shortages in this field, the desired paper is not available at the present time. It is believed that a heavy yellow paperboard can be used without the necessity of painting. Such a trap could be discarded after use. Paper available at the present time must be painted or shellacked before being used, as without this step the adhesive discolors the original shade of the stock.

Plans are under way to test traps made of yellow celluloid acetate and celluloid nitrate plastics. These materials are manufactured in any color or shade and in various thicknesses. Because of war uses their availability is limited.

Sources of Materials

Lumber or the finished boards for the traps may be ordered from local lumber dealers, box and shook manufacturers, cabinet shops, or general contractors.

Paints and lacquers may be obtained from local dealers.

Sticky materials, such as Deadline and Pestix, are available at local seed or agricultural supply stores, but if they are not sold locally, the manufacturers will supply the purchaser upon request. Deadline is manufactured by the California Spray-Chemical Corporation, Richmond, Calif., and Pestix is manufactured by the Sherwin-Williams Company, 101 Prospect Avenue, Cleveland, Ohio.

Celluloid is manufactured by the Celanese Celluloid Corporation, 180 Madison Avenue, New York, N. Y.; the Northwest Plastic Industries, 415 4th and Cherry Building, Seattle 4, Wash., and other manufacturers of this product.

The list of products and manufacturers is not presented as a complete list and does not imply any guarantee or endorsement of the product of any particular company.

Paint, lacquer, lumber, paper, and celluloid are restricted by priorities for the duration of the war. Small quantities of these products may be obtained locally under certain conditions.

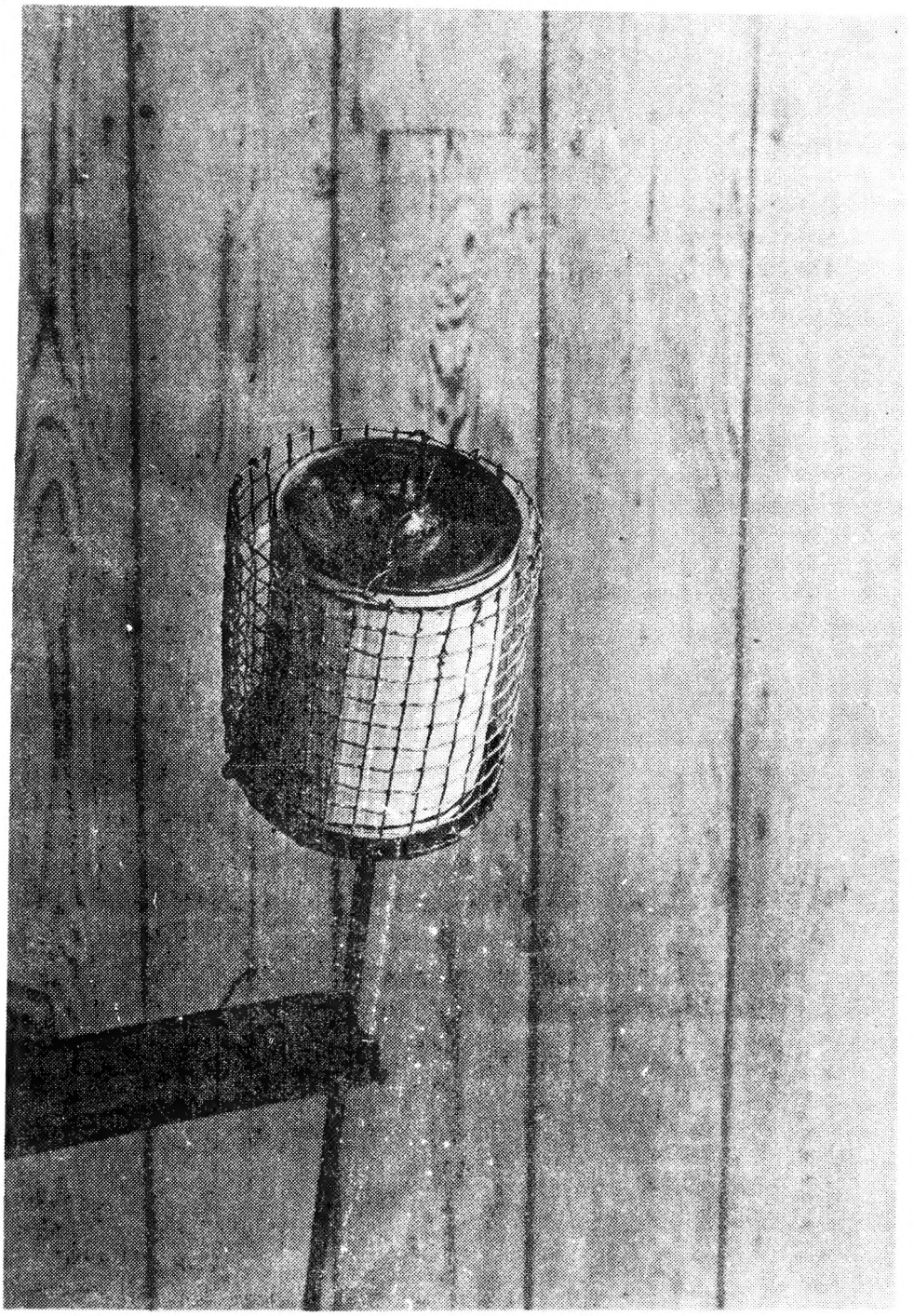

Figure 1. -- Original sticky trap for pear psylla scouting. The sticky material was placed on a sheet of paper that had been wound around a can, which was fastened to the end of an iron rod.

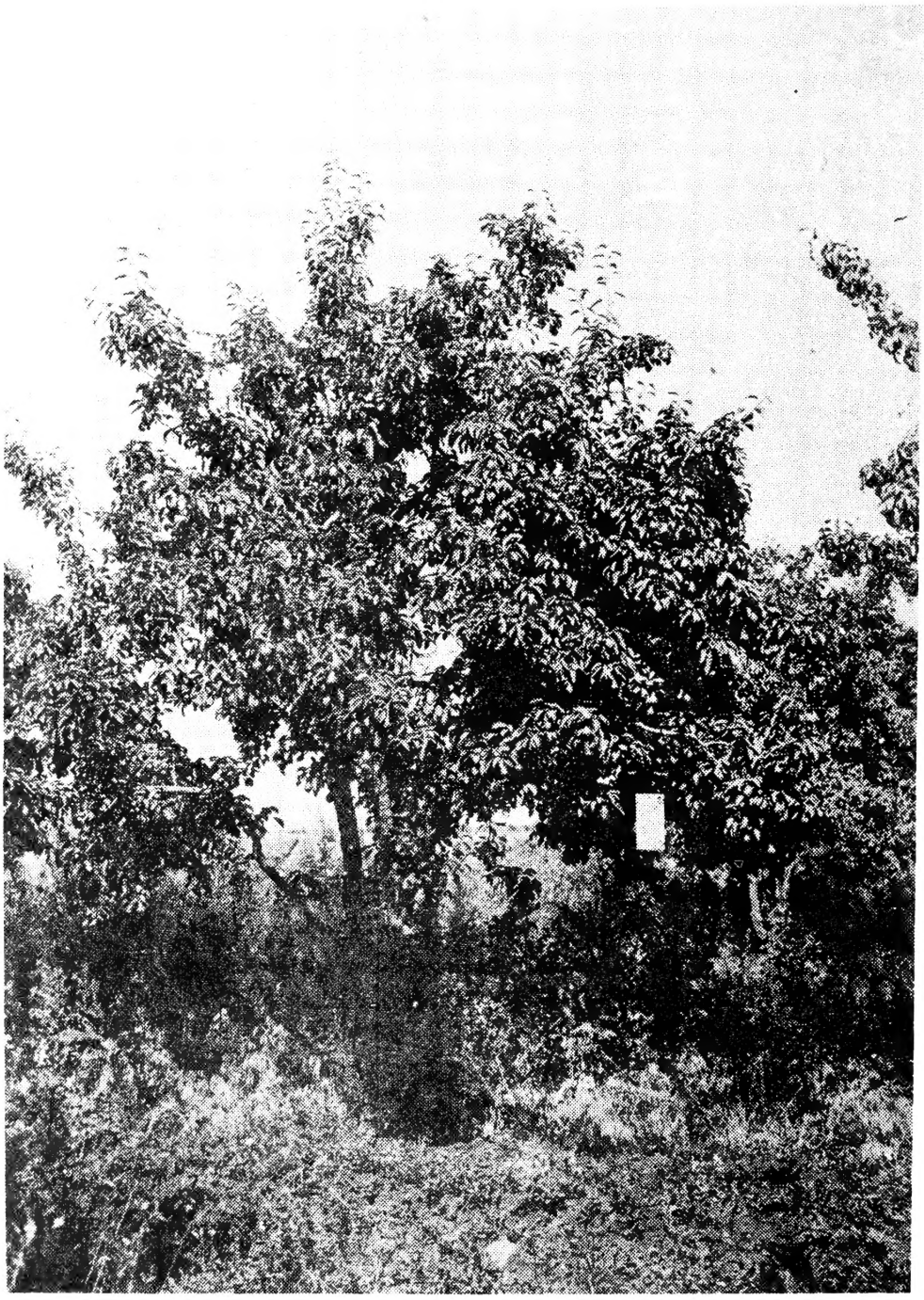

Figure 2. -- Sticky board trap in place on pear tree.

Figure 3. -- Closeup view of sticky board trap after exposure.